Background Concentrations of Metals, a Progress Report

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Background Data Sources

- United States USGS P 1648 (2001)
- California Kearney Report (1996)
- Los Angeles Basin LAUSD Arsenic Study
- Site Specific Data Sets

Background Data Concentrations

	California Statewide	Los Angeles Basin
Sb	0.15 – 1.95 (0.33 – 0.73)	0.2 – 1.5
As	0.6 – 11	1 - 6
Cd	0.05 – 1.70 (0.15-0.44)	0.2 – 1
Pb	12.4 – 97.1 (21 – 26.7)	1 – 20
Cr	23 – 1579 (45 – 115)	0 – 40
Ni	9 – 509 (21 – 56)	0 – 40
Zn	88 – 236 (133-170)	20 – 150

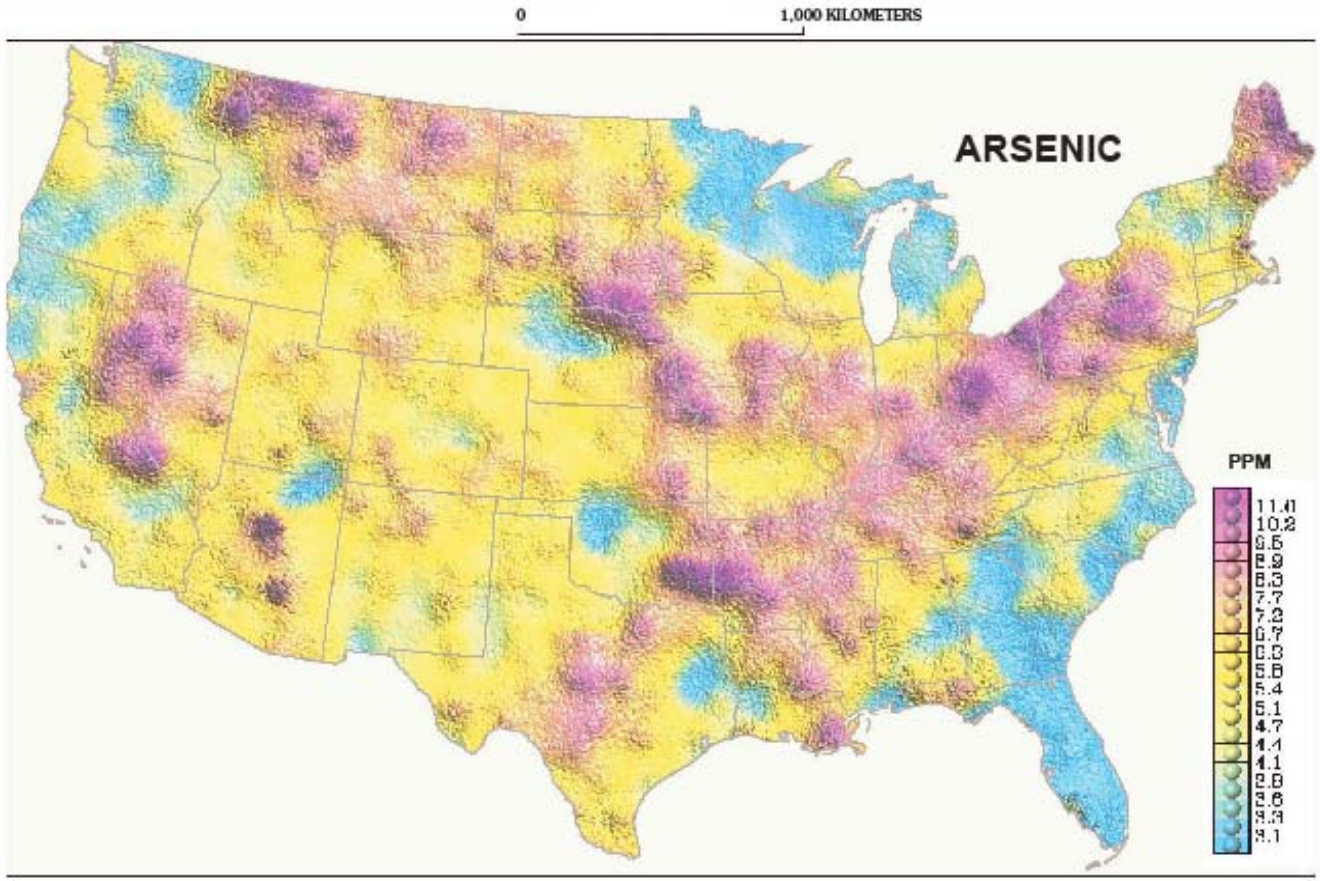


Figure 4. Colored surface map of As distribution in soils and other surficial materials of the conterminous United States.

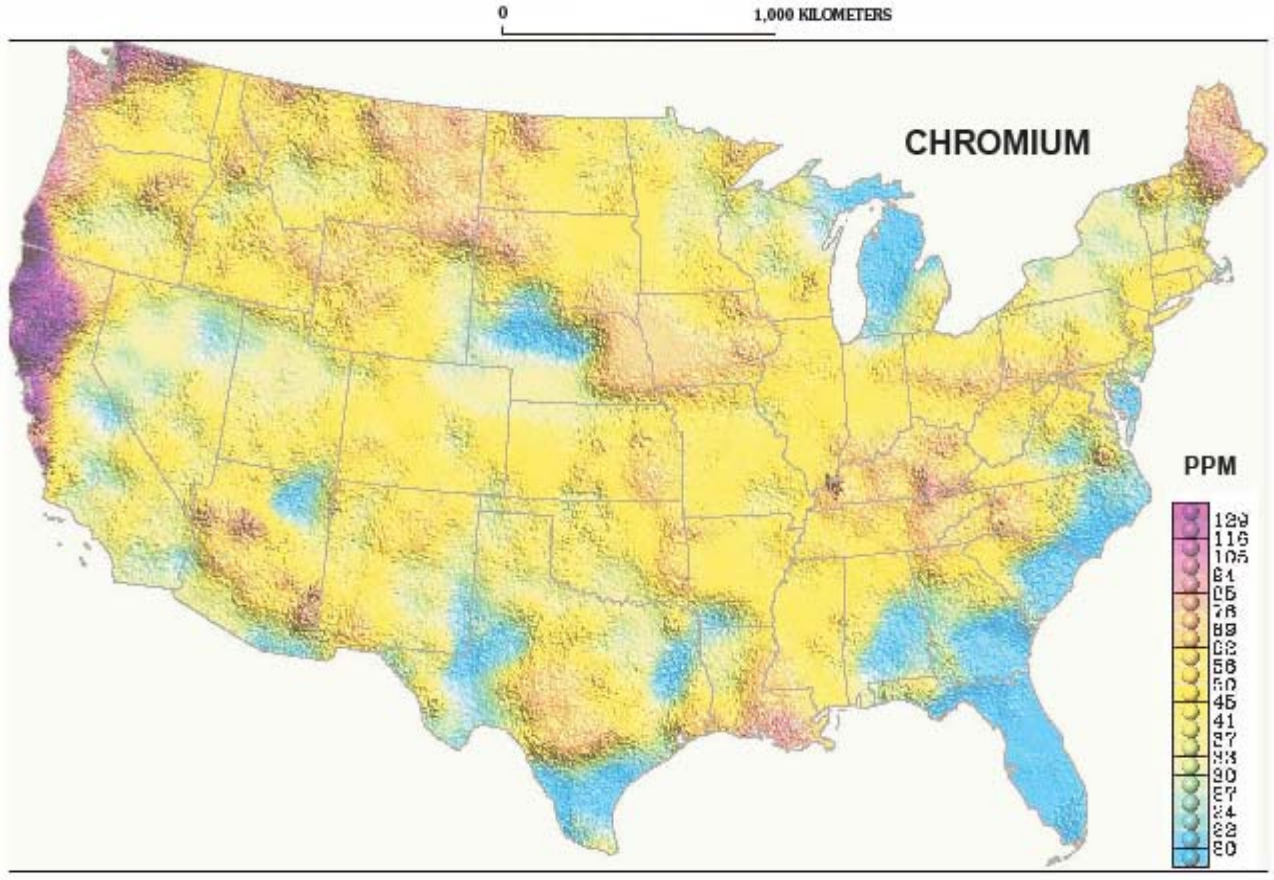
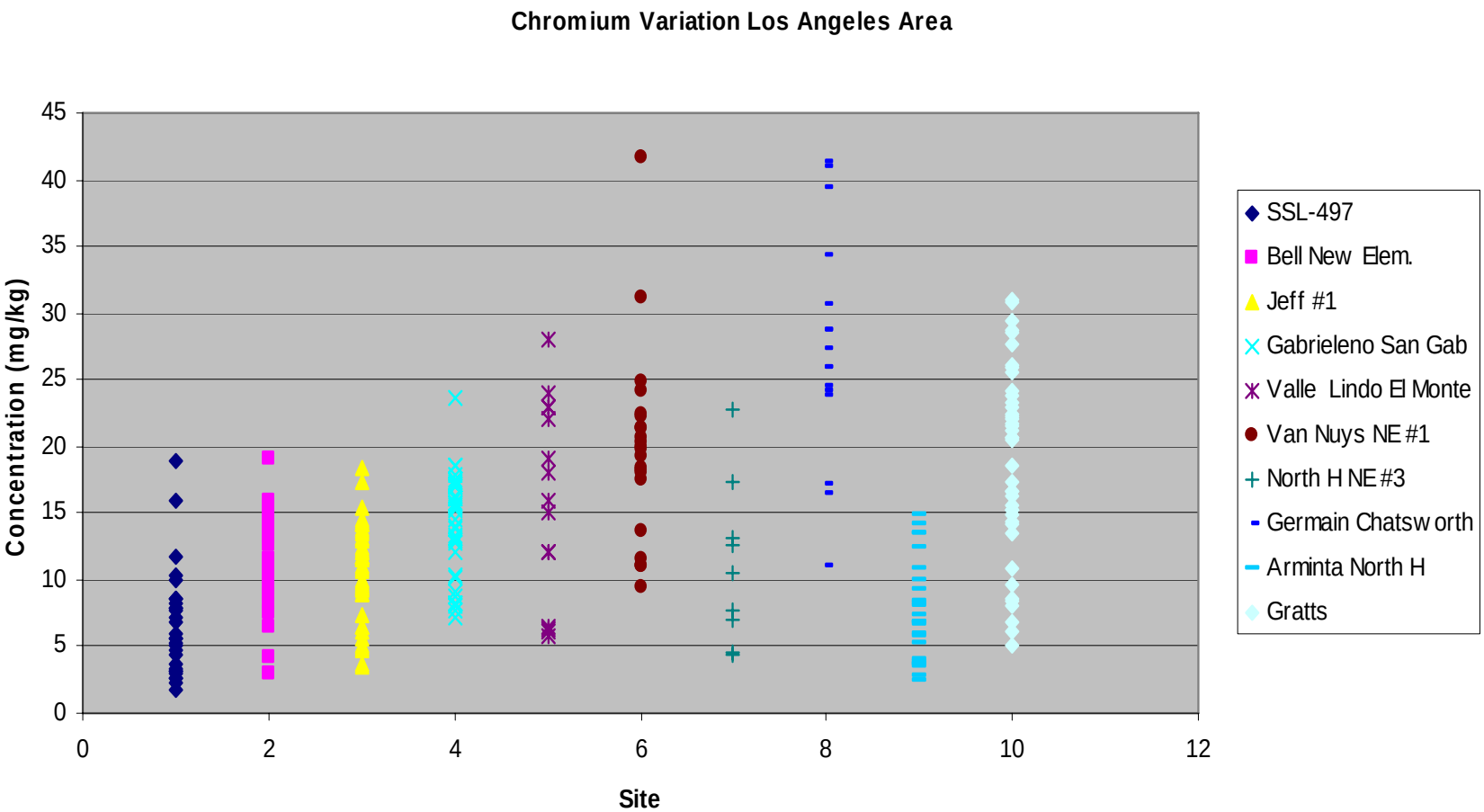


Figure 7. Colored surface map of Cr distribution in soils and other surficial materials of the conterminous United States.

Cr concentrations at 10 LA Basin sites



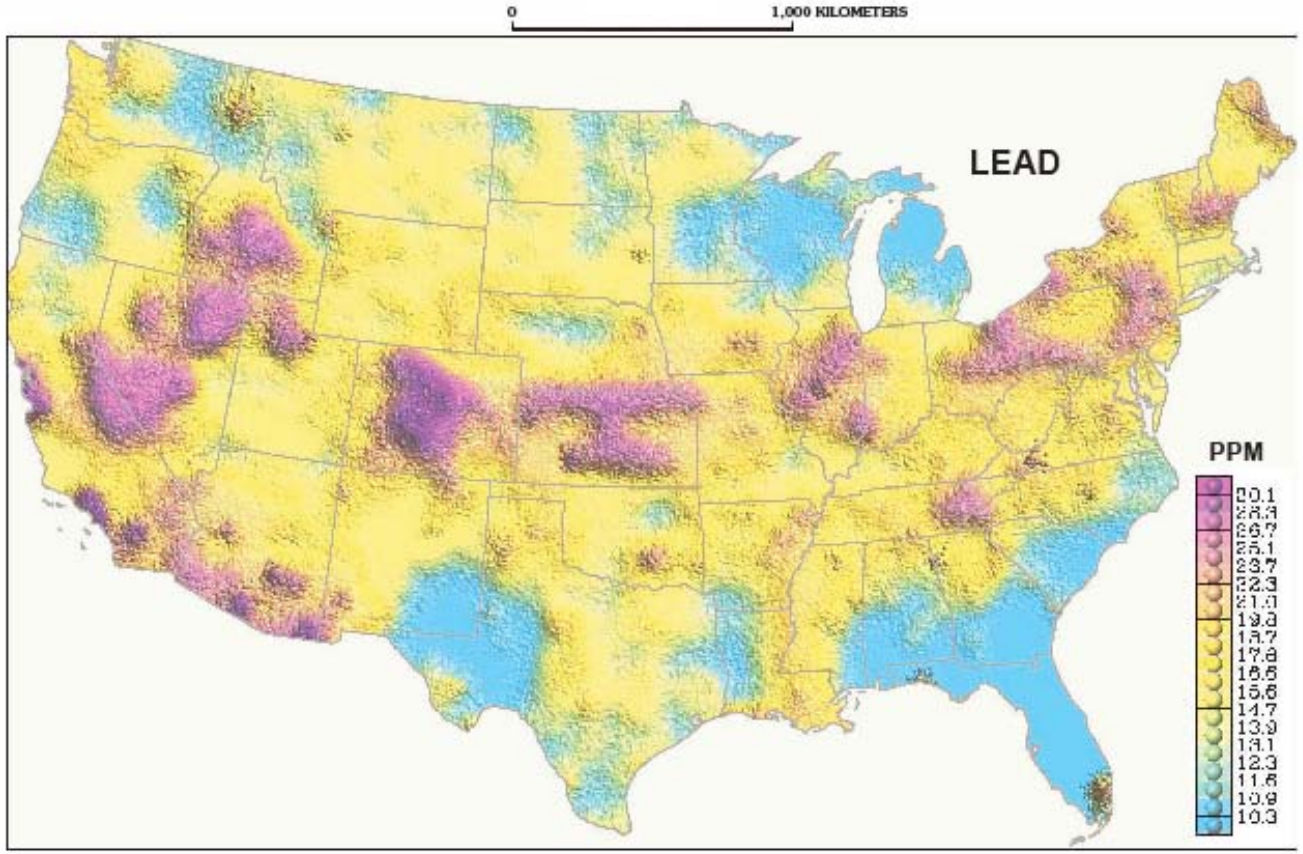
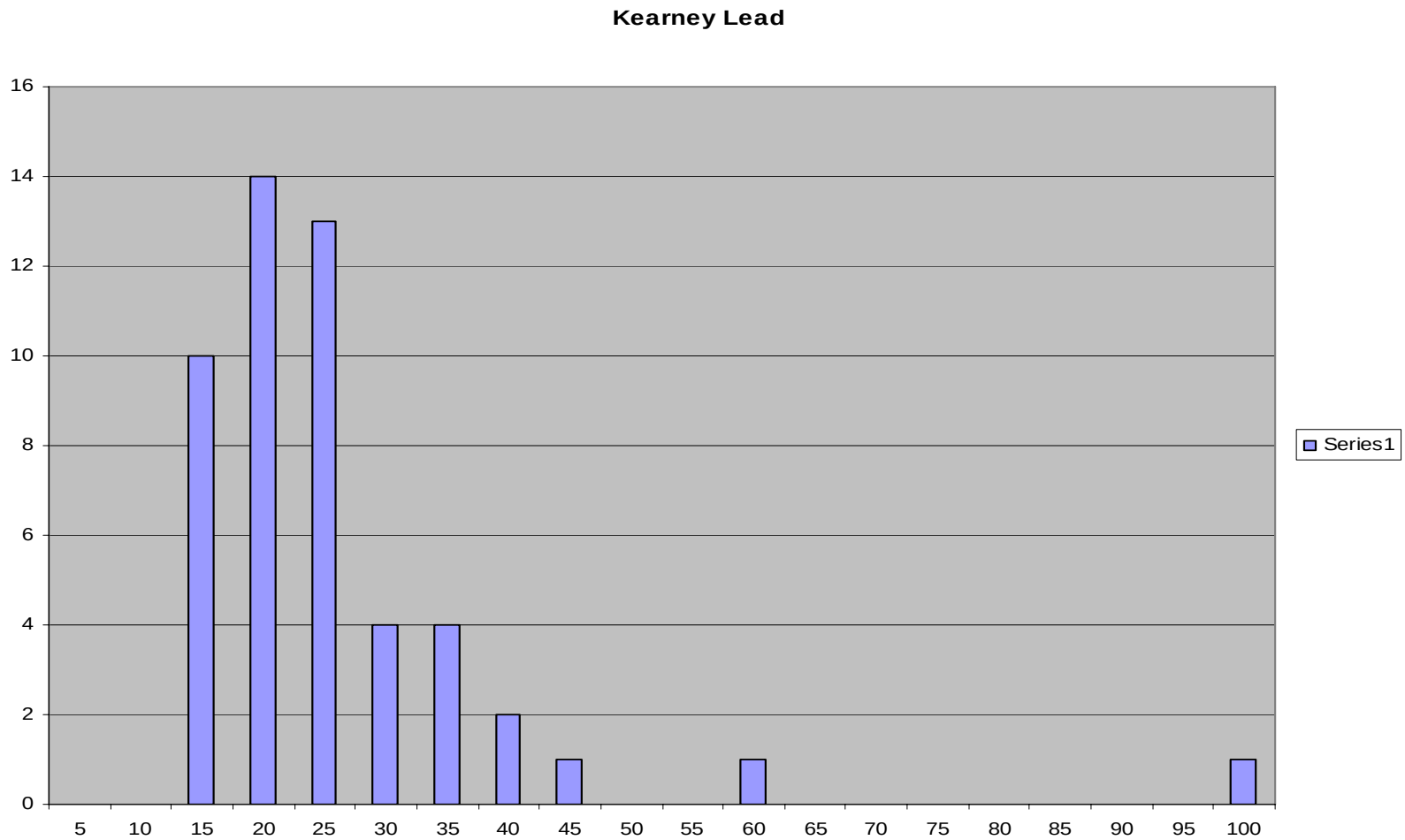


Figure 17. Colored surface map of Pb distribution in soils and other surficial materials of the conterminous United States.

Histogram of Pb concentrations in California soils



Cleanup Guidelines

	Cal EPA CHHSL		USEPA PRG			LAUSD	
	Residential	Industrial	Residential	Industrial			
Sb	30	380	30	750			
As	0.07	0.24	0.38	3.0		6	
Cd	1.7	7.5	37 (Cal mod 9.0)	930			
Cr	100,000		210	450			
Pb	150	3,500	400 (Cal mod 130)	1000		255	
Ni	1,600	16,000					
Zn	23,000	100,000					

Anthropogenic Sources of Metals

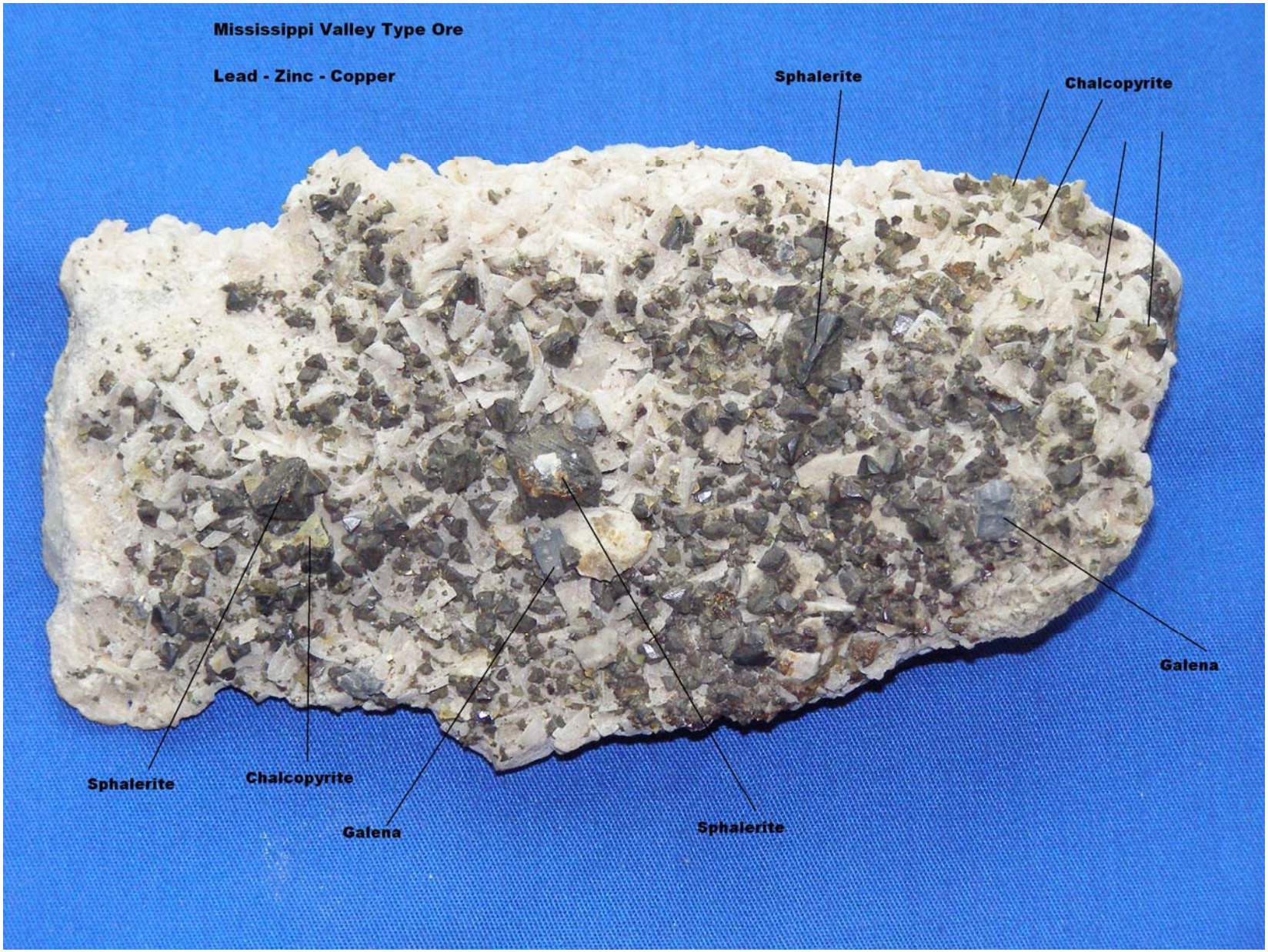
- Pb lead based paint
- Automobile exhaust
- automobile batteries

- Cr Plating solutions
  Stainless steel scrap
- As pesticide/herbicide application

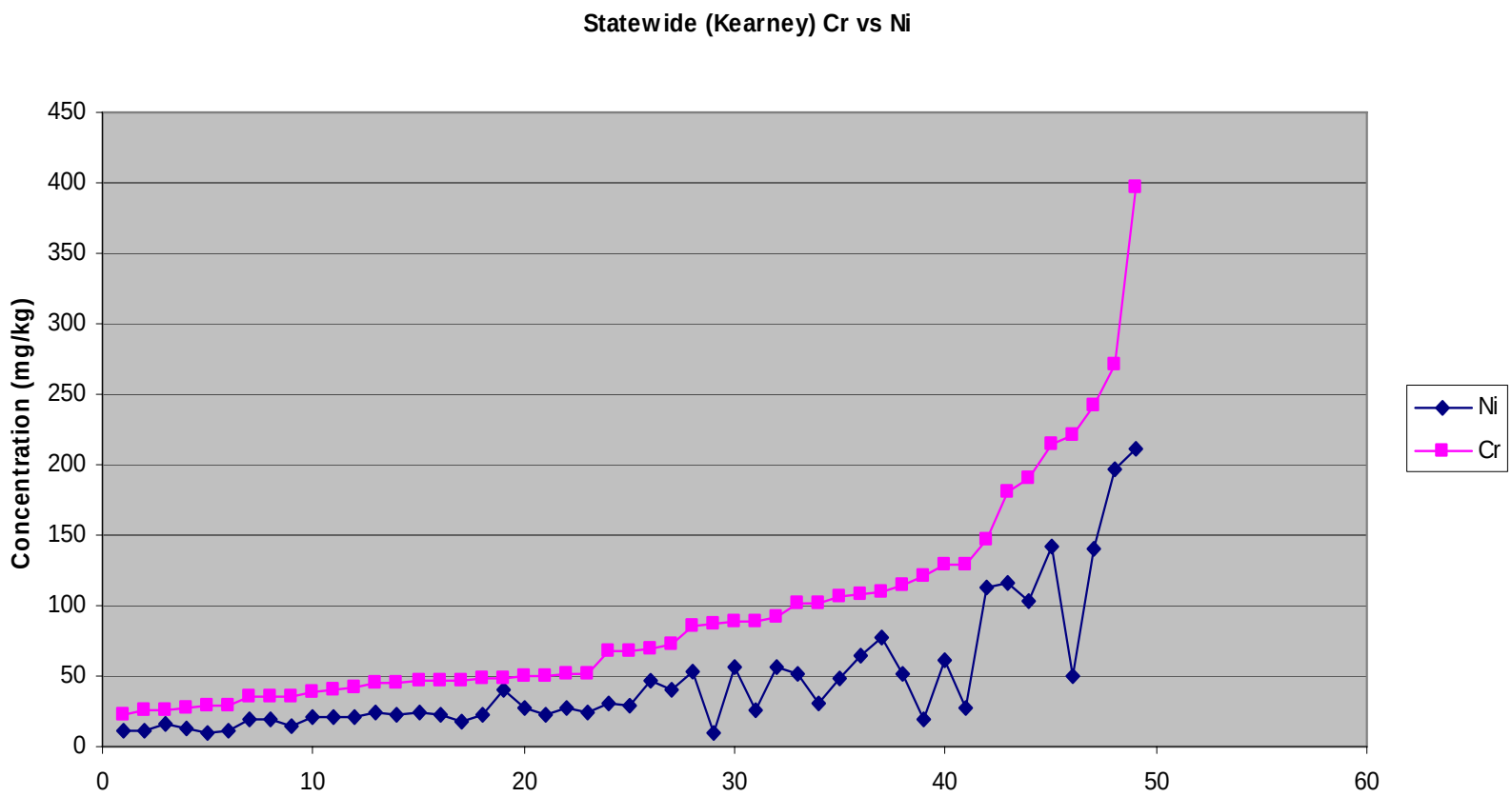

NON - MUSKEGON

Common Geologic Associations

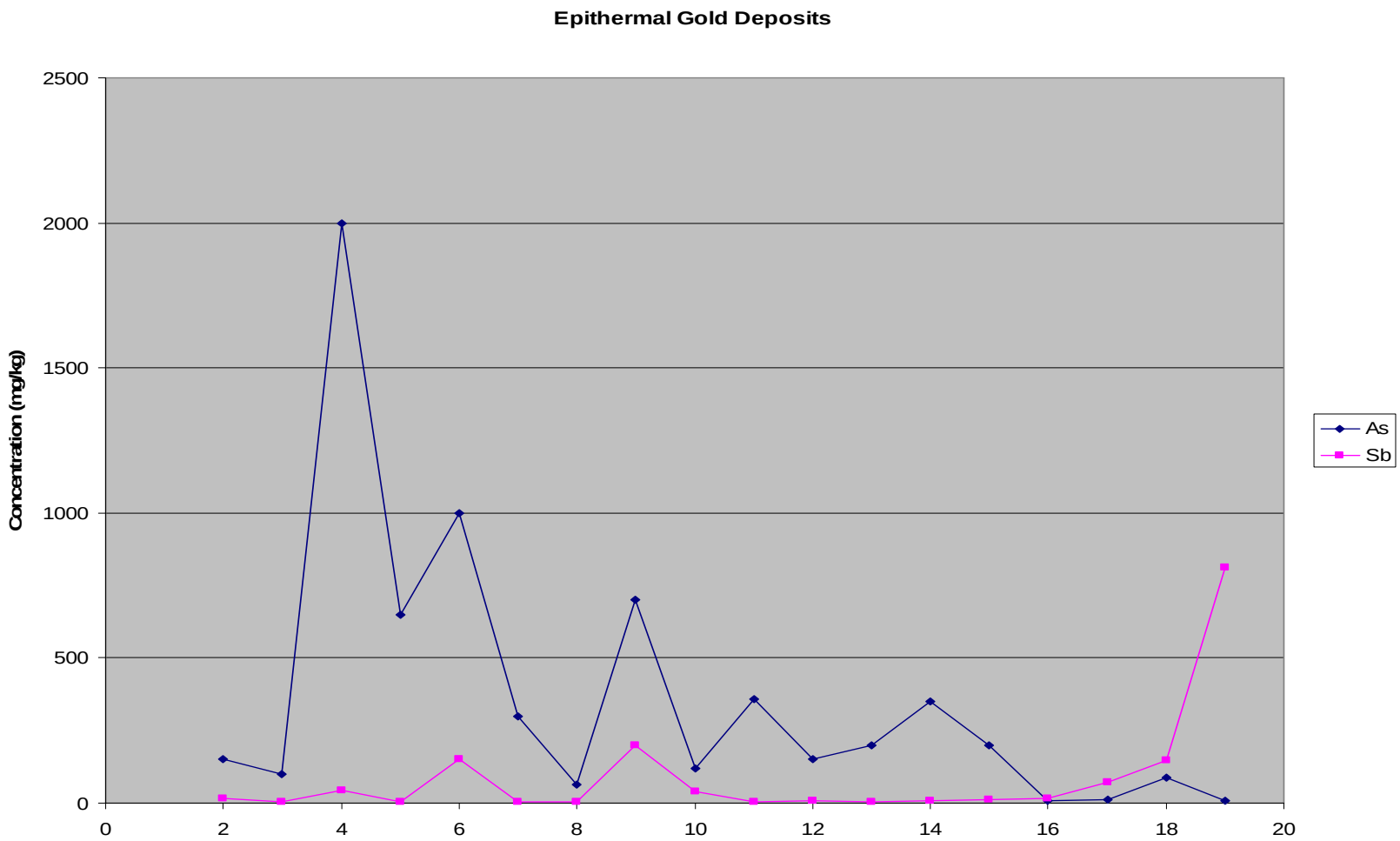
- Ultramafic Rocks Mg-Cr-Ni-Co-Cu-V
- Epithermal Gold Au-As-Sb-Hg
- Volcanogenic Massive Sulphide Cu-Zn-Pb
- K/Rb Ca/Sr Zn/Cd As/Sb


Mississippi Valley Type Ore
Lead - Zinc - Copper
Sphalerite
Chalcopyrite
Galena
Sphalerite
Chalcopyrite
Galena
Sphalerite

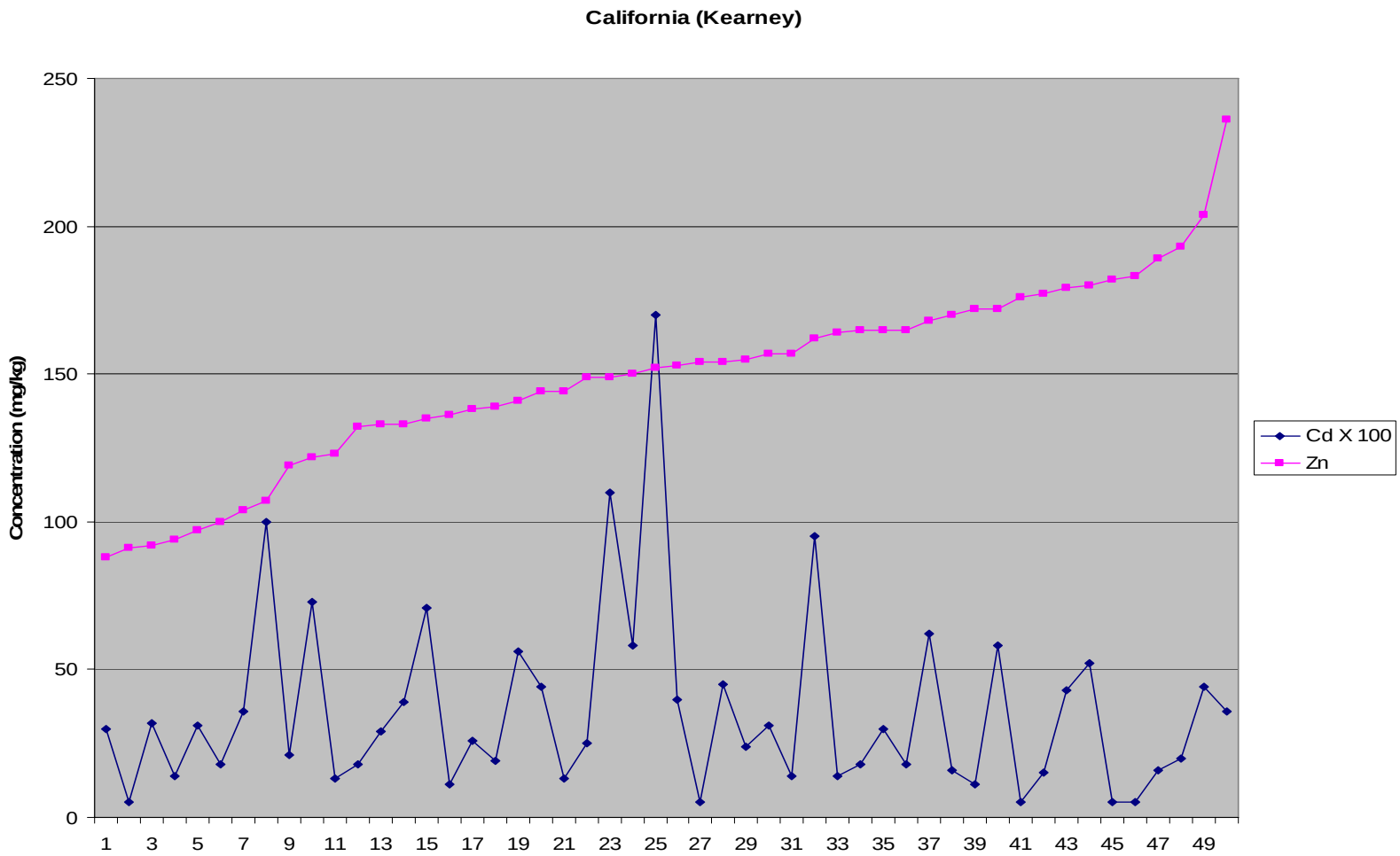
Positive correlation of Cr and Ni in soil



As and Sb concentrations in Epithermal Gold Deposits



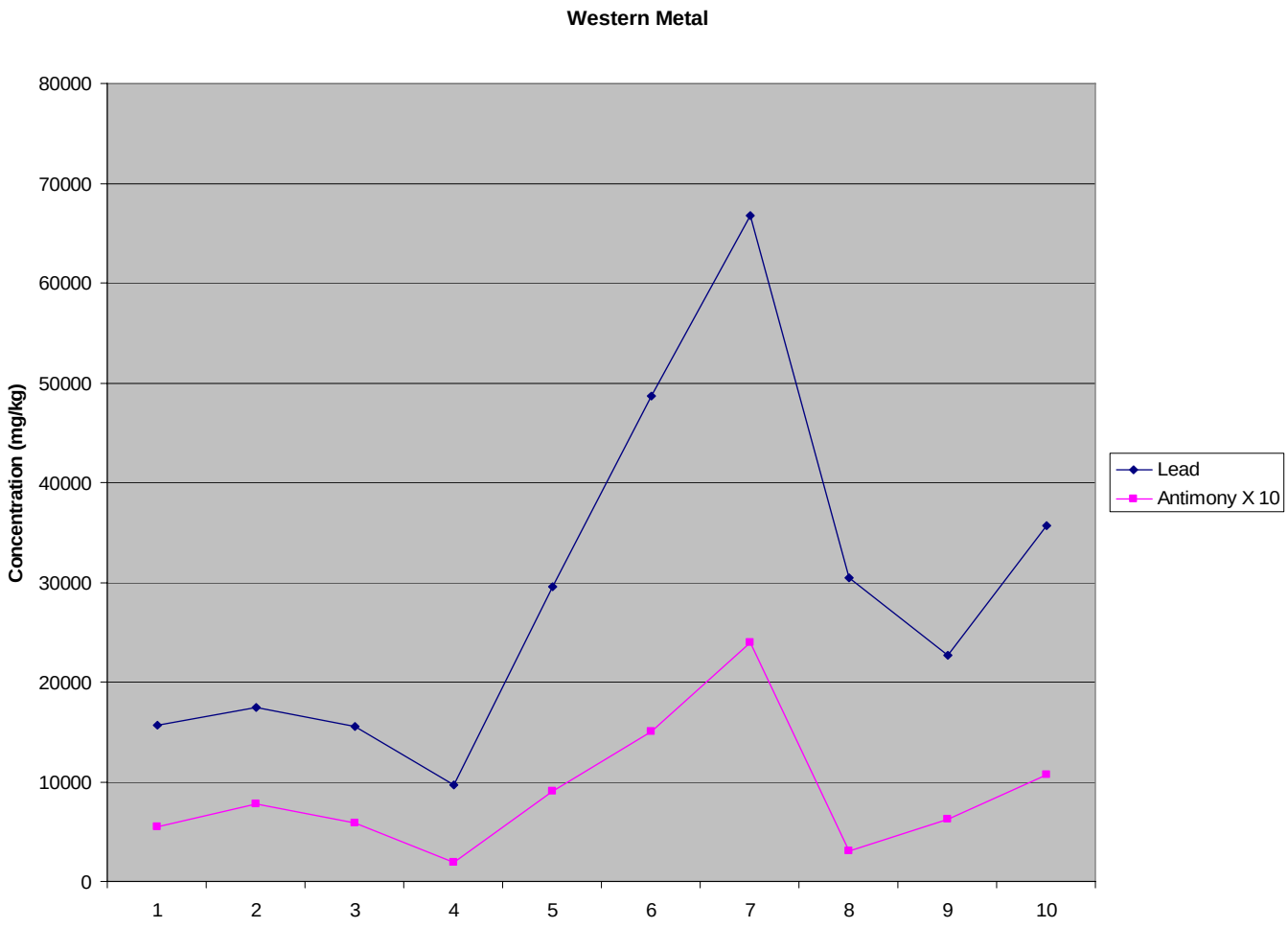
Relationship of Cd with Increasing Zn in California Soils



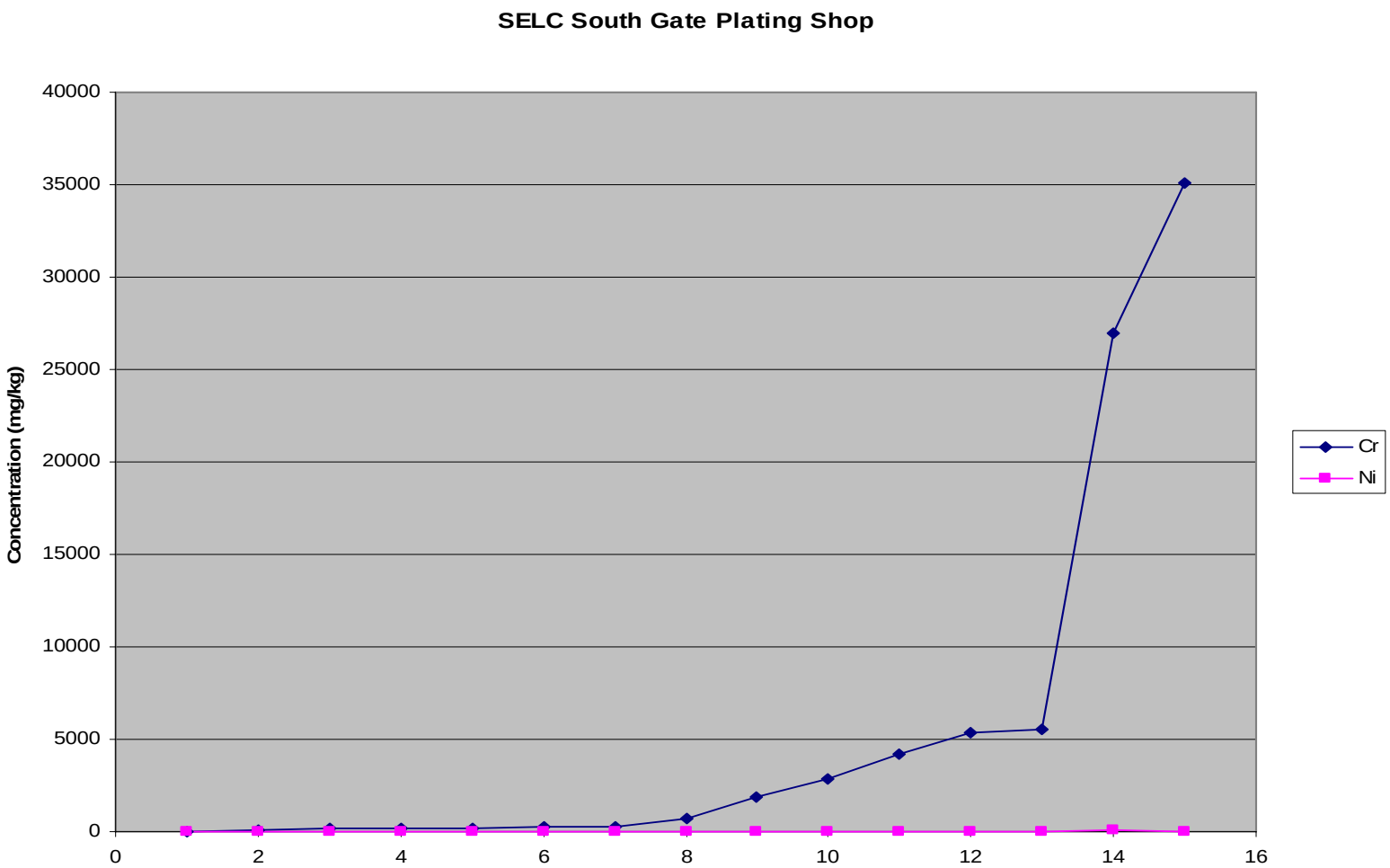
Anthropogenic Associations

- Lead Batteries Pb / Sb
- Scrap Metal
  - Bronze Cu-Zn
  - Brass Cu-Sn
  - Stainless Steel Fe-Cr-Mo-V

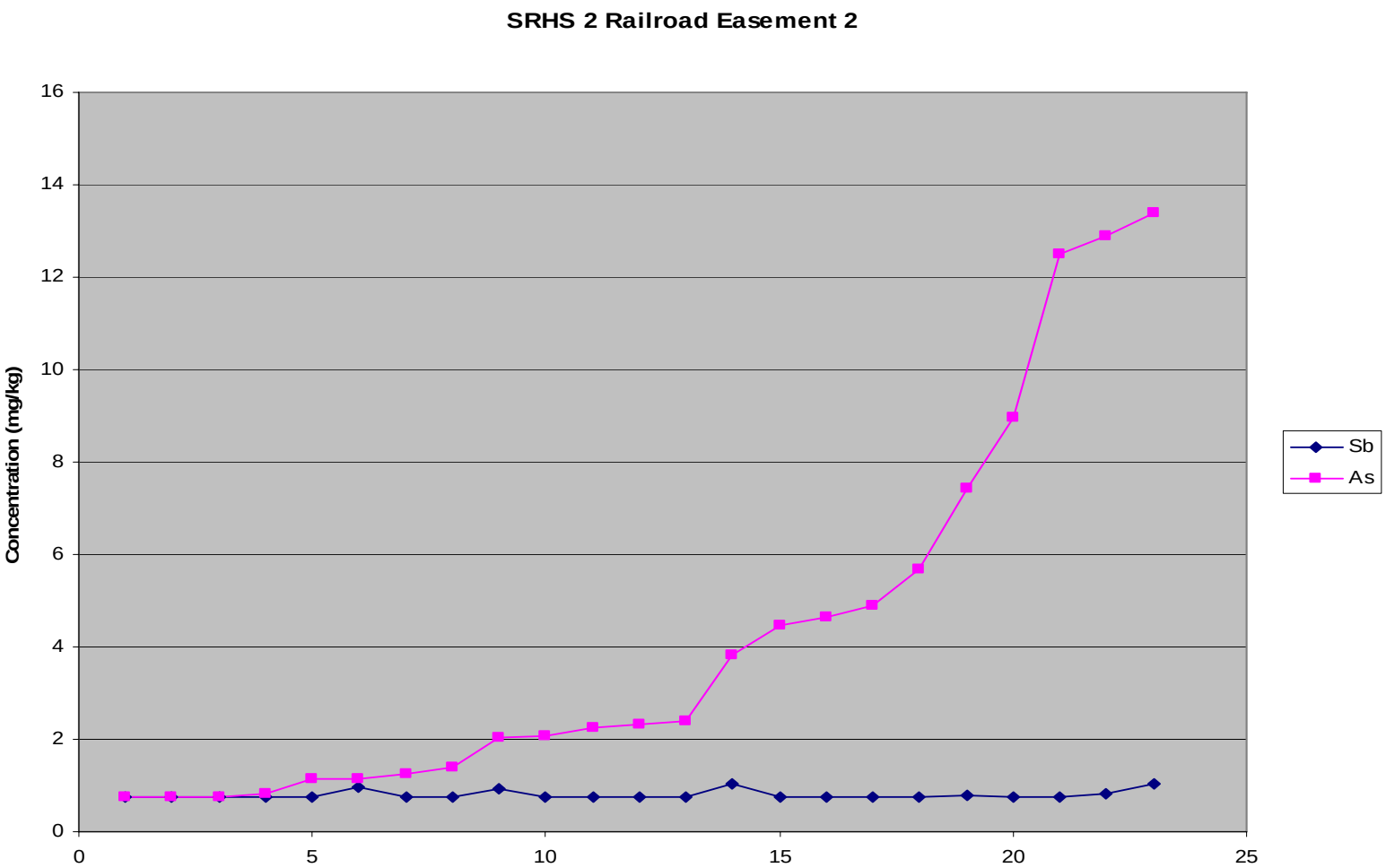
Correlation of Pb and Sb in Soil
Used Automobile Battery Recycling Facility



Cr and Ni variation in soil, former plating shop, South Gate



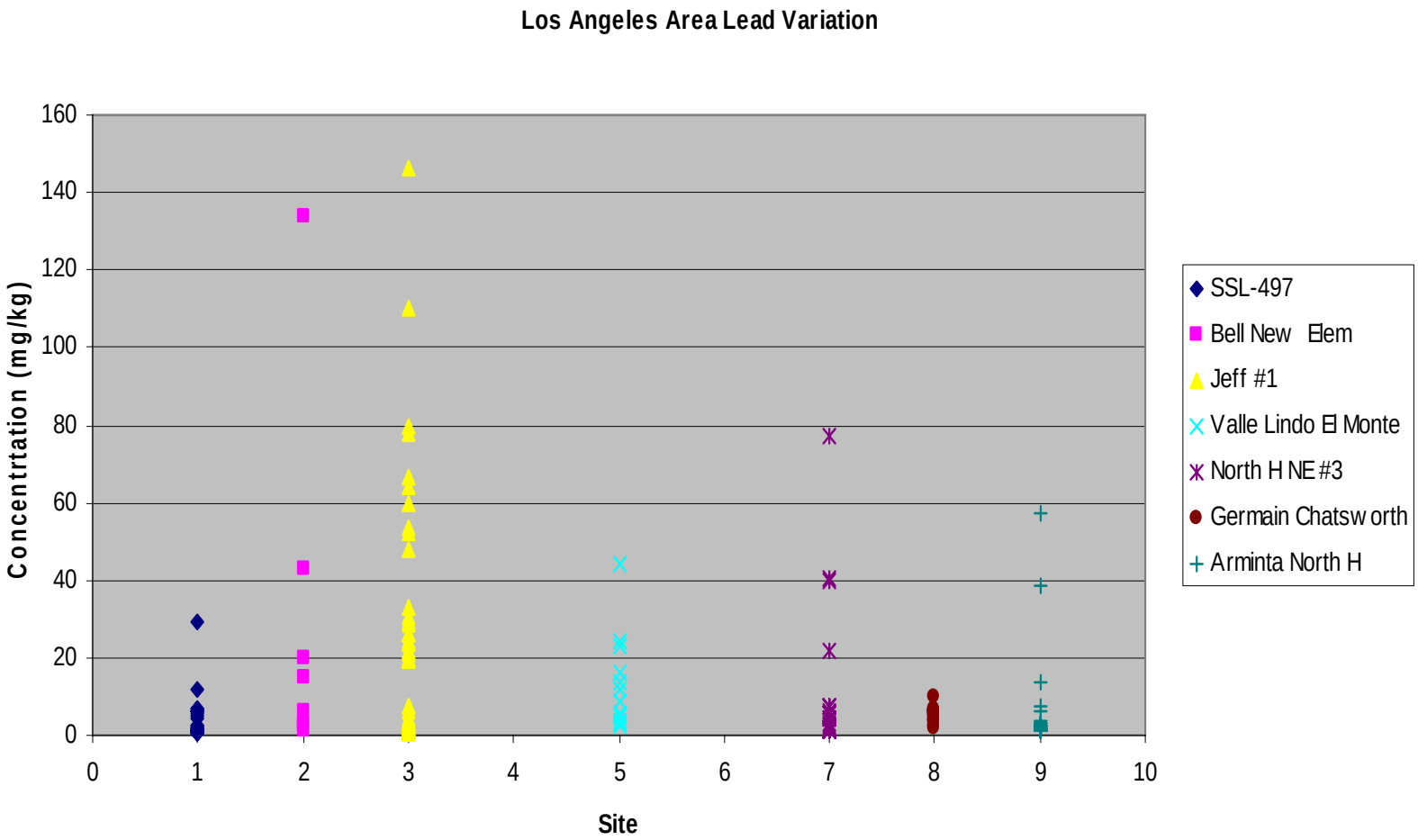
As and Sb in soil, former railroad line, Los Angeles



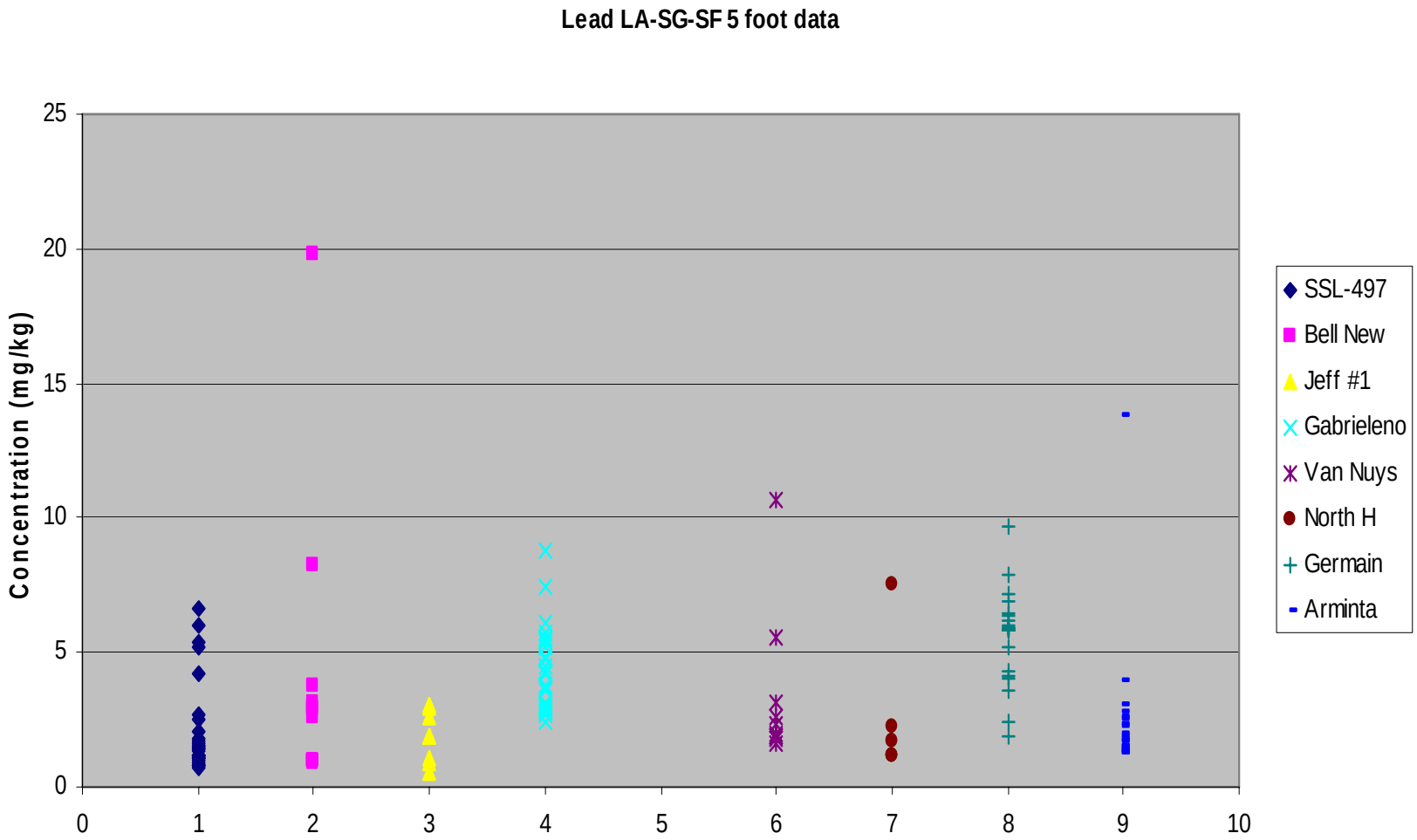
Non-Point Sources

- Automobile Exhaust Pb
- Pesticide/Herbicide Application As

Pb concentrations, surface and subsurface samples, Los Angeles Basin



Pb concentrations, 5-foot depth
Los Angeles Basin



Summary

- Site Specific and Regional Geology may have an influence on metals concentrations
- Anthropogenic impacts may mask true background
- All data should be evaluated to help differentiate between geologic and anthropogenic associations

Questions and Comments